ACHIEVING NET ZERO IN THE CATTLE SUPPLY CHAIN

AgNext
COLORADO STATE UNIVERSITY
SUSTAINABLE SOLUTIONS FOR ANIMAL AGRICULTURE

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WHY IT MATTERS

Ruminant production plays an important role in society by providing a variety of ecosystem services:

- Converting non-human edible plants to high-quality protein
- Conserving non-arable lands
- Maintaining cultural heritage and functioning landscapes
- Rural community well-being
- Creating clean air and water
- Ensuring food system security

Estimated emissions of GHGs from ruminant animal agriculture production in the U.S. have increased 19 percent since 1990.

- The primary drivers of ruminant agriculture GHG are:
  - » Enteric methane, where beef cattle are the primary contributor due to their large population numbers, with estimated emissions increasing 6% since 1990.
  - » Methane from manure where dairy cattle are the most prominent contributor due manure management and storage systems, with estimated emissions increasing 62% since 1990.

Since 1990, despite increased emissions, both beef cattle meat production and dairy cattle milk production have decreased the carbon footprint per unit of these products, demonstrating improved resource utilization.

3 PILLARS OF SUSTAINABILITY

NET ZERO DEFINED

- **Net zero means balancing the greenhouse gases a system produces with the amount it removes from the atmosphere. This typically includes all emissions across the full life cycle of a product even indirect ones, known as Scope 3 emissions.**

NET zero

Recognizing the EMISSIONS SOURCES & alternatives to reduce GHG EMISSIONS from ruminant systems is essential to achieve NET ZERO

Scan for more info on Net Zero

WHAT ARE SCOPE 1, 2 AND 3 EMISSIONS?

SCOPE 1

Emissions from owned operation

SCOPE 2

Emissions from electricity used

SCOPE 3

Emissions from growing products, from transportation to supermarket, packaging and waste

SCOPE 3 accounts for 90% of emissions for consumer food companies

ROADMAP TO ACHIEVING NET ZERO CATTLE PRODUCTION IN THE U.S.

- To achieve net zero in cattle production, a prioritized research agenda to reduce GHGs from beef and dairy cattle in the U.S. was needed.
  - » Experts from a variety of disciplines consulted to identify and classify strategies according to their efficacy for reducing GHG, potential adoption, and market readiness.

CATAGORIES DEFINED

Marginal GHG reduction:
- Strategies were prioritized based on their potential to reduce GHG emissions compared to those significantly less impacted

Potential ROI:
- Strategies with potential profitability for producers upon implementation were prioritized

Market Readiness:
- Strategies readily available in the current marketplace were favored over those not yet accessible

Enteric methane manipulation, precision grazing, improved animal health/management, improved animal efficiency, improved genetics

	KEY STRATEGIES	MARGINAL GHG REDUCTION	POTENTIAL ROI	MARKET READINESS
BEEF COW-CALF & STOCKER SECTOR	CH_4 Manipulation	High	Unknown	Unknown
	Grazing & Animal Management	Low	Unknown	Unknown
	Breed Selection	Medium	Unknown	Market-dependent
	Carbon Sequestration	Low	Neutral	Available for producers
FEEDLOT SECTOR	CH_4 Manipulation	High	Unknown	Unknown
	Feeding & Animal Management	Medium	Neutral	Available for producers
	Animal Management	Low	Positive	Available for producers
	Breed Selection	High	Unknown	Limited availability
DAIRY SECTOR	CH_4 Manipulation	High	Unknown	Unknown
	Reducing Feed Ingredient Footprint	Medium	Variable	Available
	Animal & Manure Management	Medium	Positive	Available
	Genetic Selection	High	Unknown	Limited

It is evident from this research there is no single existing strategy that meets all of the criteria of marginal GHG reduction, potential ROI, and market readiness. This demonstrates how there is extensive research that needs to be done on these strategies in order for the U.S. to achieve net zero in the cattle supply chain. Cutting-edge research at AgNext at Colorado State University is studying these strategies in an effort to move the industry forward.

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